

Image plugins for VICAR and PDS file formats and underlying technologies.

Reading and Writing Images in java

The `javax.imageio.ImageIO` class provides a set of static convenience methods that perform most simple Image I/O operations.

Beginning with JDK 1.4 the `ImageIO` API is a part of the core functionality of Java. The core `ImageIO` delivery provides plugins to read and write images in GIF, JPEG and PNG formats.

The JAI `ImageIO` beta release contains plugins for: BMP, JPEG, JPEG 2000, PNG PNM, Raw, TIFF, and WBMP.

It may be downloaded at: http://developer.java.sun.com/developer/earlyAccess/jai_imageio/

We have added plugins for the VICAR² and PDS¹ scientific image formats.

Reading an image which has a plugin available is simple:

```
File f = new File("c:\\images\\myimage.gif");
BufferedImage bi = ImageIO.read(f);
```

The format of the image will be automatically determined by the API based on the contents of the file.

The `BufferedImage` can be displayed by an application. See the Poster for JADE image display widget for an example display.

Additional formats may be handled by installing JAR files containing plug-ins. Once a plug-in has been installed, a new format will be understood automatically without any changes to the application code.

Writing an image in a supported format is equally simple:

```
BufferedImage bi;
File f = new File("c:\\images\\myimage.png");
ImageIO.write(bi, "png", f);
```

The `ImageIO` API provides many other methods and classes to allow a programmer detailed control over the reading and writing of image files.

The API provides access to the metadata contained in the images label as an XML object. The Transcoder portion of the API provides a way to convert metadata to a representation understandable by a different image format's plugin writer.

We have written a Transcoder to convert a VICAR label to a PDS label. It is being used by the MER (Mars Exploration Rover) project.

The transcoder uses XSLT scripts to perform the metadata conversion.

Underlying Technologies

SUN

`ImageIO` API and Java Advanced Imaging (JAI)

SUN supplied jars: `jai_imageio.jar` and `jai_core.jar`

VICAR

`VicarIO` libraries handle reading and writing the data from the file which are contained in `vicario.jar` in the Vicar system.

Apache: Perl like methods found in `jakarta-oro2.0.4.jar` are used to parse the header.

Apache XML libraries: `xalan.jar`, `xercesImpl.jar`, `xml-apis.jar` are used for XML and XSLT support.

JDK 1.4 contains libraries with equivalent functionality. The code will be eventually be modified to remove all dependencies on Apache libraries.

We are waiting for widespread adoption of JDK 1.4 on all platforms (the Macintosh in particular) before making the changes.

The Vicar and PDS readers and writers are included in the latest Vicar Dev system.

Steve Levee was a member of the SUN Java Community Process Expert Group JSR15 which defined the `ImageIO` specification.

1). PDS - Planetary Data System format.

The Planetary Data System (PDS) archives and distributes scientific data from NASA planetary missions, astronomical observations, and laboratory measurements.

<http://pds.jpl.nasa.gov>

2). VICAR, which stands for Video Image Communication And Retrieval, is a general purpose image processing software system that has been developed since 1966 in JPL's Multimission Image Processing Lab (MIPL) to digitally process multi dimensional imaging data.

It is not only used by JPL but by several universities, NASA sites and other science/ research institutions in the United States and Europe.

<http://www-mipl.jpl.nasa.gov>

<http://www-mipl.jpl.nasa.gov/vicar.html>

